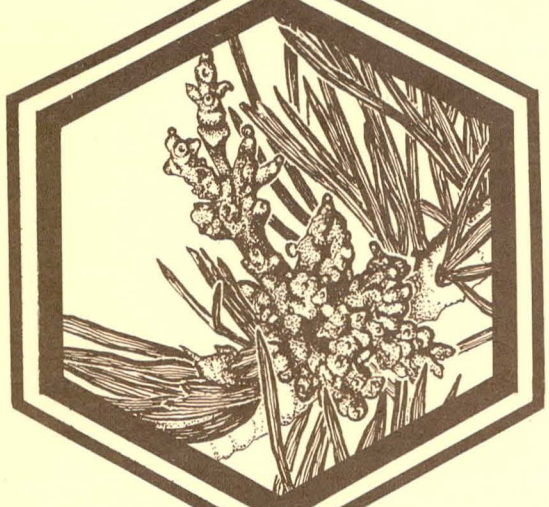
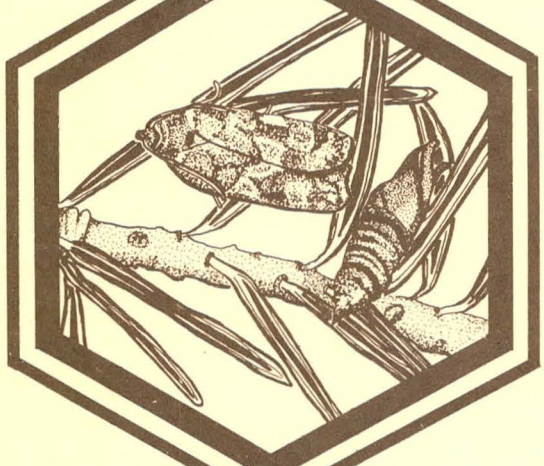
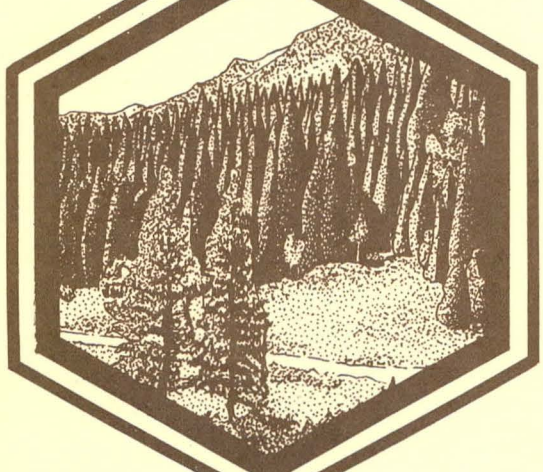
SB761
U8
#80-3

Report No. 80-3







FOREST INSECT AND DISEASE INFORMATION SYSTEM (FIDIS) IMPLEMENTATION PLAN

Methods Application Group
Forest Insect and Disease Management
Forest Service, USDA
2810 Chiles Road
Davis, California 95616

Report No. 80-3

3400
January 1980

FOREST INSECT AND DISEASE INFORMATION SYSTEM (FIDIS) IMPLEMENTATION PLAN

William M. Ciesla and Frank M. Yasinski[1]

INTRODUCTION

The objective of Forest Insect and Disease Management in the USDA-Forest Service is to reduce damage and losses caused by insects and diseases on all forest lands to levels commensurate with Forest Resource and other environmental values involved (FSM 3402).

In recent years, the concept of integrated pest management (IPM) has received considerable attention in both agriculture and forestry. As defined in the planning regulations of the National Forest Management Act (NFMA) of 1976, integrated pest management is:

> A process in which all aspects of a pest-host system are studied and weighed to provide the resource manager with information for decision making. Integrated pest management is, therefore, a part of forest or resource management. The information provided includes the impact of the unregulated pest population on various resources' values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies. Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system. Strategies consist of a combination of tactics such as stand improvement plus selective use of pesticides. The overriding principle in the choice of strategy is that it is ecologically compatible or acceptable.

Integrated pest management, therefore, consists of two distinct parts: (1) information systems for decision making, and (2) the availability of ecologically compatible alternatives that the resource manager may use to regulate pest populations to levels commensurate with his management objectives.

---

1 Authors are, respectively, Group Leader, USDA-Forest Service, Forest Insect and Disease Management, Methods Application Group, Davis, CA 95616; and Leader, USDA-Forest Service, Forest Insect and Disease Management, Forest Entomology and Pathology Groups, Washington, D.C. 20013.

OBJECTIVE

A data management system for FI&DM, Forest Insect and Disease Information System (FIDIS), is presented.

Data that are sound, timely, and comparable are required on the current status and trend of major forest insect and disease pests for pest management decision making. The objective of FIDIS is to provide a framework for storage and retrieval of data on status of major forest insect and disease pests.

Data required for pest management decision making varies with the level of management. In the NFMA planning regulations, three planning levels are recognized within the Forest Service: Forest, Regional, and National (table 1).

If resource managers are to reduce losses incurred by destructive pests through integrated pest management, a sound information base is needed. Action alternatives are selected in light of anticipated behavior of the target pest, economic benefits to be derived, and potential environmental consequences of the proposed action.

At the National or Regional level, summaries of the status of major pests and losses incurred are needed for several reasons, including setting priorities for action and research programs; accounting for insect and disease losses in projections of resource yields from forest lands; accomplishment reporting; and keeping a concerned public informed when outbreaks, often of a controversial nature, occur.

SYSTEM CHARACTERISTICS

FIDIS is intended to be responsive to data requirements at all planning levels. It is structured primarily to satisfy Regional and National data requirements. Since the concept of FIDIS is to develop summary information through an aggregative process, the system will be structured to handle in-place information needed for pest management decisions at the management unit or Forest level.

One of the primary benefits of FIDIS is to allow comparison of data between Regions and Areas. This will be accomplished through clear identification of data elements and levels of precision, and definition of ecological and political strata by which the data will be summarized.

In order for information on the status of insect and disease pests to be meaningful to the resource manager, it must be capable of being interfaced with data on soil types, vegetation, access, land-use classifications, and other resource data information. This would enable the resource manager to take insect and disease considerations into account during land management planning, when planning for preventative actions through cultural practices, and when responding to outbreaks using ecologically sound pest management practices.

Table 1. Information requirements for Forest Insect and Disease Management by NFMA Planning Level.

Planning Level	Data Required	Uses of Data
Forest	Detailed descriptions of present and projected losses on a management unit basis (i.e., stand, compartment) in a form that can be integrated with interdisciplinary resource data (soils, vegetation, topography, management constraints, etc.) for management planning.	Selection of most appropriate pest management strategy to protect or increase resource outputs compatible with management objectives.
Regional National	Summaries of acres infested, mortality, and growth impact by major insect and disease agents and land ownership class on a statewide basis.	Provides basis for establishing priorities and funding of action and research programs. Integrate insect and disease damage with projections of resource outputs from forest lands. Provide data for accountability for expenditures, activities, and accomplishments. Respond to inquiries from Congress and the public.

When fully implemented, both tabular and graphic outputs will be available through FIDIS for reporting status of major pest species and accomplishments achieved through pest management action programs.

DATA ELEMENTS

FIDIS is structured to provide two levels of data: Level I, a summary of acres infested by major insect and disease pests or pest complexes; and Level II, a summary of loss information in terms of mortality and growth impact. These levels conform more or less with the present data collection procedures. Level I information is obtained from aerial and ground detection surveys currently performed by Regions/Areas FI&DM staffs; Level II information is derived from special loss assessment surveys.

Level I

1. Year

   Annual data summaries are required for Level I information on insects. Disease status information is required at 5-year intervals and should be collected concurrently with Level II data.

2. Insects and Diseases

   Specific insect and disease pests for which data are needed at the National planning level are defined for each Region or Area (table 2). Data on pests of Regional significance also may be reported at the discretion of the Region/Area.

3. State or Portion of State

   Summaries are required by State. For States where two Forest Service Regions occur, for example, Idaho (R-1 and R-4) or Wyoming (R-2 and R-4), data summaries are needed by each Regional segment of the State. Regions/Areas may collect data on a county basis and aggregate for National reporting.

4. Land Ownership Class

   Data are required within each State by the following land ownership classes:

   a. National Forest
   b. Other Federal (i.e., BLM, NPS, BIA, military, etc.)
   c. Industrial private lands
   d. Non-industrial private lands
   e. State, county, or municipal lands

Table 2. Insect and disease pests for which reporting is required under FIDIS at the National Planning Level.

Region/Area	Pest or Pest Complex	Host(s)
1,2,3,4,6	mountain pine beetle	lodgepole, ponderosa pines
1,2,3,4,6	western spruce budworm	Douglas-fir, true fir, spruce
1,3,4,5,6	Douglas-fir tussock moth	Douglas-fir, true fir
5	fir engraver	mixed conifer, red fir
5	western pine beetle	mixed conifer, ponderosa pine
1,2,3,4,5,6	dwarf mistletoes	lodgepole, ponderosa pines, western hemlock, Douglas-fir
1,2,3,4,5,6	root rots	all conifers
10	spruce beetle	white spruce
NA	spruce budworm	balsam fir, spruce
	gypsy moth	hardwoods
SA	southern pine beetle	southern yellow pines
	fusiform rust	loblolly and slash pines
	pitch canker	slash pine

5. Acres Infested

Report acres infested by each pest species by host type and land ownership class. For foliage-feeding insects, report acres of aerially visible defoliation. For mountain pine beetle and spruce beetle include areas with concentrations of 0.1 dead or dying trees/acre of host type; for southern pine beetle include areas with one multiple tree spot per 1000 acres of host type. For fir engraver and western pine beetle, report areas with concentration equal to or greater than 0.5 dead or dying trees/acre.

Level II

1. Mortality - Number of trees killed during year of survey.

2. Mortality - Volume of trees killed in thousands of cubic feet during year of survey.

3. Growth Impact - In thousands of cubic feet for the period five years previous to year of survey.

   Suggested output format is shown in Tables 3, 4, and 5.

4. Precision - Desired precision for each pest species for Level II information is a standard error of 20 percent of the mean for mortality and growth impact at the state level.

5. Resolution - For insects, five-year updates of annual loss estimates are required. For diseases, updates at 10-year intervals are required. A full data set should be available for the 1989 RPA Assessment.

IMPLEMENTATION SCHEDULE

Full-scale implementation of FIDIS depends on the ability to acquire needed information for a specific pest or pest complex. This ability is defined in two ways: (1) Does a survey method currently exist to provide estimates within the desired precision? and (2) Is the method logistically feasible in light of present personnel and funding levels?

Ability to acquire Level I information, acreage infested by land ownership class on a statewide basis, exists for all pest species which require reporting. Data on insect and disease status should be reported for the 1979 field season in January 1980 for inclusion in the Forest Insect and Disease Conditions Report.

Methods for obtaining Level II outputs within the specified level of precision are available for only two of the pests for which information is required at the National planning level (table 6). None of these has been shown to be logistically feasible on an operational scale. A

Table 3. Example of an aggregated tabular output - bark beetle.

Status of Mountain Pine Beetle Infestations in Lodgepole Pine
Western United States, 1980

State	Land Ownership Class	Acres Infested	Number of Trees	Mortality (MCF)
Colorado				
	National Forest			
	Other Federal			
	State, County, or Municipal			
	Non-industrial Private			
	Industrial Private			
	Total			
Idaho				
	National Forest			
	Other Federal			
	State, County, or Municipal			
	Non-industrial Private			
	Industrial Private			
	Total			
Wyoming				
	National Forest			
	Other Federal			
	State, County, or Municipal			
	Non-industrial Private			
	Industrial Private			
	Total			
Grand Total				

Table 4. Example of a tabular output - defoliator.

Status of Western Spruce Budworm Infestations
Washington,1980

Land Ownership Class	Acres Infested				Mortality (MCF)	Growth Loss (MCF)
	Light	Moderate	Heavy	Total		
National Forest						
Other Federal						
State, County or Municipal						
Non-industrial Private						
Industrial Private						
Total						

Table 5. Examples of a tabular output - bark beetle.

Status of Southern Pine Beetle Infestations
North Carolina, 1980

Land Ownership Class	Acres Infested	Number of Trees	Mortality (MCF)
National Forest			
Other Federal			
State, County or Municipal			
Non-industrial Private			
Industrial Private			
Total			

Table 6. Level II accomplishment timetable.

Insect or Disease Pest	Capability Exists for Achieving Stated Precision	Logistically Possible at This Time*	Target Date for Operational System	Lead Region
Western Regions (1,2,3,4,5,6,10)				
mountain pine beetle	yes	to be determined during FY '79	FY '80	1 - LP 2 - PP
western pine beetle	yes	no	FY '83	5
fir engraver	yes	no	FY '83	5
western spruce budworm	no	no	begin planning FY '79	1
Douglas-fir tussock moth	no	no	develop action plan pending compendium	6
dwarf mistletoes	no	no	FY '84	1 - LP 3,6 - PP 10 - Hemlock
root rots	no	no	FY '84	1,6
spruce beetle	no	no		10
Northeastern Area				
spruce budworm	no	Proposed pilot project - NA, NE Station, State of Maine	FY '82	NA
gypsy moth	yes	FY '81	FY '81	NA
Southeastern Area				
southern pine beetle	no	to be determined by the Mississippi Pilot Project FY '80	Mississippi Pilot Project FY '81	SA
fusiform rust	no	FY '82	FY '84	SA
pitch canker	no	FY '82	FY '83	SA

* MAG will provide technical assistance to implement Level II targets for the listed pests, utilizing existing technology.

tentative schedule for development and evaluation of appropriate survey methodology to achieve the desired precision is shown in table 6 with lead Regions/Areas designated. In the interim, existing loss information without a level of precision will be accepted for National reporting if it is available.

DATA STORAGE AND RETRIEVAL

Data storage and retrieval for FIDIS are the responsibility of the Regions/Areas. To support FIDIS, the National office of FI&DM has proposed purchase of a Geographic Information System. If approved, this system will provide for analysis, storage, and retrieval of geographic data for all pest species included in FIDIS, and will have the ability to interface with other in-place resource information (Young 1979).

REFERENCE CITED

Young, R.W. 1979. Project proposal--Acquisition of a geographic information system. USDA-For. Serv., FI&DM/MAG, Davis, CA. 39 pp. plus appendix.